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# FISHES OF THE FAMILY

# XENOPOCLINIDAE

by

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Fellow of Ichthyology

Illustrations by Margaret M. Smith

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# FISHES OF THE FAMILY XENOPOCLINIDAE

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J. L. B. SMITH

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Family **Xenopoclinidae nov.**

As is well known, there is a sharp line of distinction at the Cape between the warmer waters of the east and south coast of Africa, and the cool seas of the western Cape areas, with corresponding cleavage in the marine fauna. It was in this cooler area that a specimen of the first member of this group, **Xenopoclinus kochi** Smith, 1947, was discovered, and at that time it was given subfamily rank in the Clinidae. Until recently only the holotype was known, but now not only have further specimens been secured, but also a second species in this genus, and even more striking is the discovery of a second genus and a third species from the same locality. These forms all show clear relationship with the Blennioid fishes, but despite the numerous families in that order, I cannot find any among them that are so clearly related to the fishes described here, as to be able to assign this small group with certainty to any one. The peculiar characters appear to merit full family rank, as is given here.

This singular group of sand-dwellers lies to some extent between the Clinidae and the Dactyloscopidae, the latter being small fishes related to the Uranoscopidae, hitherto found on sandy shores, apparently known only from tropical America. From the known Dactyloscopid fishes the Xenopoclinidae differ in the presence of vomerine teeth, in having a soft dorsal fin much shorter than the spinous part, in the much smaller, embedded, non-imbricating scales, in lacking cilia on the opercle and lips, in having the gillmembranes united, forming a fold across the throat, and in the presence of an up-turned hook-like projection, or of a bony plate, on the inner margin of the shoulder girdle of some forms. In all these respects the Xenopoclinid fishes resemble rather the Clinidae, but differ from them in the peculiar head, in the expanded opercular membranes, and especially in the Dactyloscopid form of the pelvics, as well as in the greater relative length of the anal fin. They may be regarded as "Cliniform" fishes that have become adapted to a sand-dwelling existence.

The new genus described below, found in the same small pool as both species of **Xenopoclinus**, has been included in the same family with them, for while it differs in the more elongate Ammodytid-like form, in the extended lower jaw, in the dentition, and especially in the nature of the lateral line, which is subcontinuous, it resembles **Xenopoclinus** in skeletal structure, in the presence of 2 anal spines, and especially in the form of the typical jugular 3-rayed pelvics, as well as in the rudimentary scaling. It is noteworthy that both genera and all three species were found living in sand in one pool at low tide mark at Lamberts Bay, southwestern Cape coast, (about 32°7'S x 18°32'E), where the water temperature was 13°C, together with numerous weed haunting Clinid fishes. No comparable forms have been found in the warmer waters of the south and southeastern coasts of South Africa. From close study of the habits of the Clinidae I found no evidence that any are sand-dwellers, all South African species are found among stones or rocks or in weed, whereas all three members of the Xenopoclinidae were found living in sand.

The family is diagnosed as follows: Small elongate sand dwelling fishes with sparse, rudimentary, non-imbricating cycloid scales on body, none on head. Lateral line incomplete or discontinuous posteriorly. Mouth moderate, lower jaw projects, fine teeth in bands in each jaw, sometimes teeth on vomer, none on palatines. Gillmembranes united, free from isthmus, form a fold across the throat. Gillrakers feeble. An upturned hook-like process, or a plain bony lamina, may be present on the margin of the shoulder girdle beneath the operculum. The dorsal and anal fins long, the dorsal of numerous pungent or feeble spines and many fewer soft rays, its origin on the head or behind. The anal of two spines and numerous soft rays. The pelvics of a hidden spine and three soft rays, the membrane almost to the apex, resembling a webbed foot. The caudal rounded. All fin rays simple.

From a stained and cleared specimen of **Xenopoclinus leprosus n. sp.** the following skeletal data have been obtained: Vertebrae 15+35. Most vertebrae with a bispinate dorsal lamina with one or two small perforations, bearing the neural spine, the caudal vertebrae with a minute posterior second haemal spine (see Fig 1). The ribs sessile. Six equally spaced branchiostegals, the last ~~fibre~~-like, its apex reaching beyond the hind margin of the opercle. Pectoral radials four, hour-glass shaped, equally spaced. Premaxillary pedicels spatulate, shorter than the rami, the latter obliquely truncated apically, this part abutting against the maxilla when the mouth is closed. The skeleton of **Cancelloxus burrelli nov.** is almost exactly similar, but there are 14+49 vertebrae.

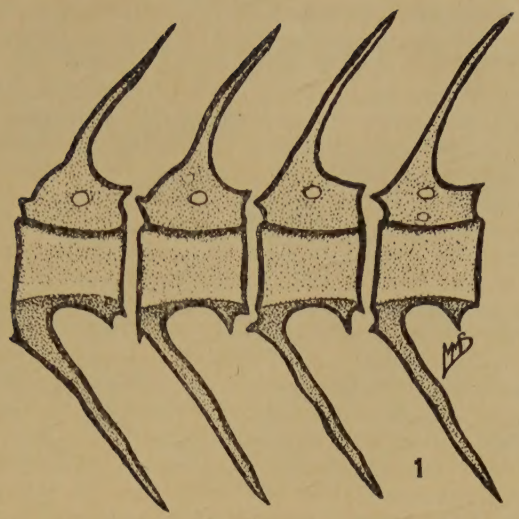


Fig. 1. Front caudal vertebrae of **Cancelloxus burrelli n.sp.**, from male, 79mm.

## KEY TO GENERA

I. Dorsal origin on head. Lateral line forms a high curve anteriorly. Mouth oblique. Teeth on vomer. P 12 ..... **Xenopoclinus**

A. A hook-like projection on edge of shoulder beneath operculum. Opercular membranes greatly expanded, overlapping below ..... Subgenus **Xenopoclinus**

B. Edge of shoulder beneath operculum without any projection. Opercular membranes normal ..... Subgenus **Xenopoclinops nov.**

II. Dorsal origin behind head. Lateral line curves down from shoulder, of simple tubules each on an enlarged scale. Mouth horizontal. Vomer edentate. A small plate-like bony process on inner margin of shoulder girdle. P 14-15 ..... **Cancelloxus nov.**

**Genus Xenopoclinus** Smith, 1947.

Smith, Ann. & Mag.Nat.Hist.1947, (11), XIV, 732. Type **Xenopoclinus kochi** Smith, 1947. Elongate compressed body, mostly covered with minute non-imbricating cycloid scales, head naked. Head depressed, eyes dorsal in anterior fourth. A disc-like fleshy papilla above the eye. Mouth oblique, small teeth in bands in jaws and on vomer. Gillmembranes united, free from isthmus, form a fold across the isthmus, rakers rudimentary. An upturned hook-like projection on shoulder margin below operculum may be present. Dorsal originates on the head, long, chiefly of low spines. Anal long with 2 weak spines. Pelvics of a spine and 3 rays, resemble a webbed foot. All fin rays simple. 2 species in Southwest Africa, in sand at low tide mark, divided by subgeneric rank, as shown above. The species are also very differently and characteristically marked.

Subgenus **Xenopoclinus** Smith, 1947.

**Xenopoclinus (Xenopoclinus) kochi** Smith, 1947.

Smith, Ann.&Mag.Nat.Hist.1947, (11) XIV, 732 ,fig. 1; and Sea Fishes S.A. 1949, 358, fig.1004.

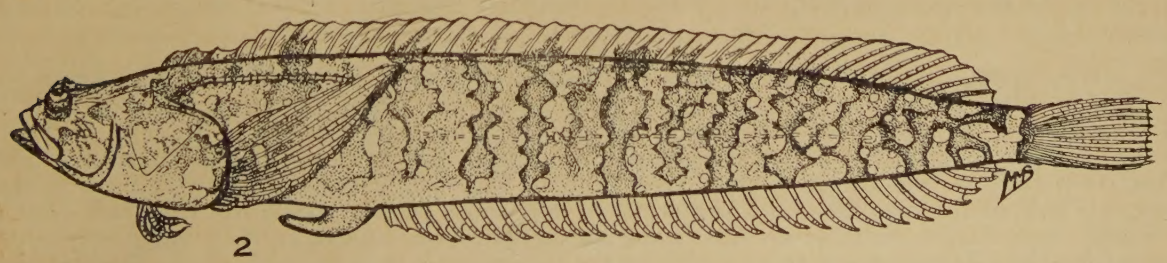


Fig. 2. **Xenopoclinus (X). kochi** Smith. Male, 80mm.

The following amended description is based on 25 specimens, 16 females, 34-96mm total length, and 9 males, 42-80mm total length, recently found living in sandy pools at Lamberts Bay, South Africa (32°7'S x 18° 32'E). D XXXIII-XXXV 8-10 (total 42-44). A II 28-31. P 12. V I 3. L.l tubules 25-27+31-34. Lateral series about 150. 2+1+6-7 feeble gillrakers. Depth 5-6, head about 4.5 in body. Eye 8 in head, equals snout, twice interorbital, 6 in postorbital part of head. The body is moderately compressed. The head is anteriorly depressed, the eyes are in the anterior fourth. There is a small flat fleshy disc-shaped papilla on each eye. The anterior nostril is tubular with a small simple cirrus behind, the posterior is a plain pore close before the eye, the anterior lies about midway between eye and snout tip, and the four nostrils form almost a square. The interorbital and occiput have numerous fine pores, there is a series round the preopercle margin, and one across the nape. The gillmembranes are united and form a fold across the throat, but are quite free from the isthmus. The gill filaments are tufted, on the outer arch the outer series of filaments is half the length of the inner. Pseudobranchiae are present as single tufted or " feathery " filaments. The gillrakers are rudimentary. There is a typical " Clinid-like " upturned hook-like projection on the inner margin of the shoulder girdle below the operculum. In one specimen there is only a narrow bony ridge, clearly a deformity, in several there is an undulating series of small bony laminae below the hook-like projection. The opercular membrane is greatly expanded to form a flap that covers the branchiostegals and most of the pectoral base. There are no cilia on the opercle. The snout is rather blunt, the mouth moderate, oblique, the maxilla reaches below the hind part of the eye, the lips smooth. In each jaw there are fine, short, conical teeth in a band that is widest anteriorly, with a single outer series of slightly enlarged similar teeth. There is an angular band of 2-3 series of fine teeth on the vomer, none on the palatines. The tongue is rounded and free. The male has a large intromittent organ, almost one half head length in large males, shorter in the smaller. Its apex is slightly expanded with three blunt points, the median largest.

The dorsal fin was originally described as being in two parts, an anterior group of three spines. This now clearly appears due to injury. There is only one continuous fin that originates on the head above the middle of the opercle. The first two spines are close together, the third stands in a wide interspace between the second and the fourth, the remainder behind are closer together. The first three spines are low, the second is the longest, about equal to eye. The fourth spine slightly exceeds the eye, the remainder increase slightly posteriorly to the last, which is about twice eye. The front soft rays of the dorsal are longer than the spints but decrease posteriorly, the last shortest, recumbent, is bound to peduncle. The anal is inserted below about the twelfth dorsal spine, about two thirds of a head length behind the head, well in advance of the tip of the pectoral. The first spine is shorter than the eye, the second about equals the eye, the soft rays are low in front, the first about 1.5 times eye, or are subequal posteriorly, about the 27th-28th longest, the hinder shorter, the last bound to peduncle. The base of the anal is 1.7-1.8 in body length, 1.3-1.4 in the total dorsal base, and equals (or is little less than) the distance from the tip of the pectoral to the caudal base. The pectoral, of twelve simple rays, is pointed and little shorter than the head. The pelvic consists of a small, completely hidden spine and three simple thickened rays, the median longest, 2.4 in head, the rays webbed for two-thirds of their length. The caudal is gently rounded, 1.7 in head.

The scales are minute, thin, cycloid, and embedded, in rows with faint vertical skin folds between, but nowhere imbricate. There are about 45 vertical series to the end of the pectoral, and about 150 in all to the caudal base. The scales become progressively smaller and more widely dispersed towards the caudal, there are only few on the peduncle. The head is naked, as are also the nape, the shoulder below the front two dorsal spines, the belly, the chest, and the pectoral base. There is a narrow naked area along the anal base. The scales between the front part of the lateral line and the base of the dorsal are much smaller and feebler than those below the lateral line. The lateral line consists of a front portion of 25-27 adjacent tubules, each opening by a pore above and below. This is not continuous with the lower straight hinder part of the lateral line, which consists of 31-34 separate simple tubules that run almost to the caudal base, the hinder being feeble grooves.

In the freshly caught fishes the body was highly variegated and speckled in pure white on faint dusky olive, forming vague narrow irregular cross-bars, little darker, margined thinly in dark brown, the whole giving an effect like coarse moist sand. The head was mottled, with pink sheen above, the iris golden, the flat ocular papilla white. The dorsal was hyaline, speckled red, the anal and pelvic plain hyaline, the caudal yellow. The pectoral was mainly hyaline, a narrow brown line down across the base of the rays, beyond this a group of 6-8 small silvery speckles. This fish was almost perfectly camouflaged as it lay on the coarse sand. This species, hitherto known only from the female type, is evidently quite abundant in certain sandy areas near low tide mark. Despite search in other localities to the north and the south, it has so far been found only about Lamberts Bay.

Subgenus **Xenopoclinops nov.**, genotype **Xenopoclinus leprosus n.sp.** as defined in key above.

**Xenopoclinus (Xenopoclinops) leprosus n.sp.**

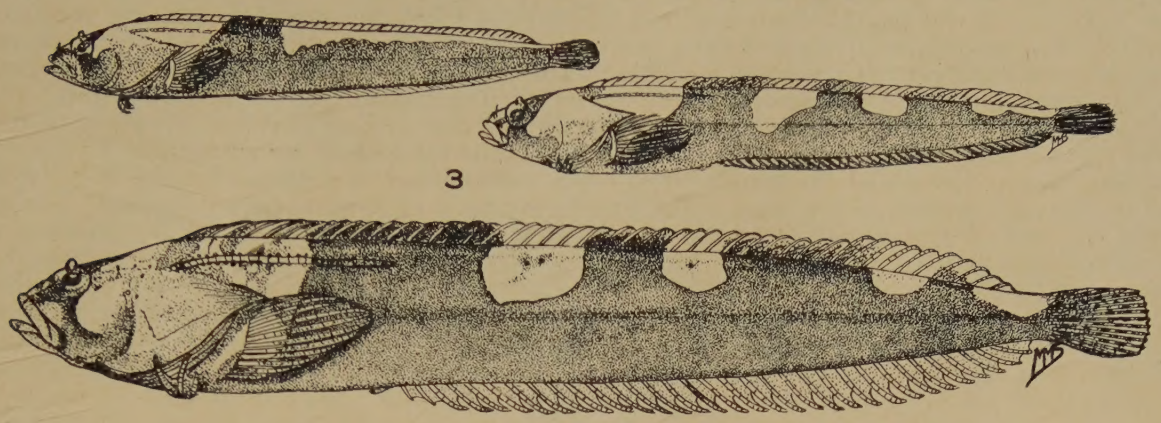

Fig. 3. **Xenopoclinus (X). leprosus n.sp.** Type, 49mm.
Above, juveniles, left at 27mm, right at 31mm length.

D XXXII-XXXV 10-11 (total 42-45). A II 30-32. P 12. V I 3. Cd 1+11+1. Gillrakers 1+1+7, short, rudimentary. L.l. 25-26 (+30-33). Depth about 6.5, head 4-4.3 in body. Eye 5.5-6.4 in head, twice interorbital, equals snout, and about 4.5 in postorbital. The body is moderately compressed, the head is anteriorly depressed, the eyes are subdorsal and in the anterior fourth of the head. On top of each eye there is a flat skinny process, about twice as wide as long, its length 3.5 in eye. The anterior nostril is tubular with a small simple cirrus behind, the posterior is a plain pore close before the eye, the anterior lies closer to the eye than to the snout tip. The four nostrils lie almost at the corners of a square. There are numerous pores on the interorbital and nape, a series round the preopercle margin, and one across the nape. The gillmembranes are united and form a fold across the throat, but are quite free from the isthmus. The gill filaments are tufted, pseudobranchiae are present as single filaments. The gillrakers are small, short and slender. The opercular membrane is scarcely expanded, not covering the pectoral base or overlapping below, but forms a fold above the axil, the apex extending well beyond the pectoral base above. There are no cilia on the opercle. There is no hook-like process on the edge of the shoulder beneath the operculum, but in a few specimens there is a rudimentary bony process forming a slight groove. Males have an intromittent organ, its length in the type about 5 in head, in smaller fishes it is relatively shorter, the apex is slightly expanded, with 3 feeble points, the median longest.

The snout is subconical, the mouth oblique, the maxilla reaches below middle of eye. There is in each jaw a band of 4-5 series of fine conical teeth, the outer series little enlarged, and a patch of similar teeth on the vomer, the palatines edentate. The tongue is free, subtruncate. The single dorsal fin originates on the head above the middle of the opercle. The spines are all flexible and more or less subequal to the eye, the front two are close together, the third is set in a wide interspace between the second and the fourth, but there is no division of the fin. The front soft rays are little longer than the spines and feebly articulated, the last ray is joined to the peduncle well in advance of the caudal base. In the smaller specimens it is scarcely possible to distinguish between spines and soft rays, the total dorsal count being 42-45. The anal is inserted below about the thirteenth dorsal spine. The spines are flexible, thickened, the second longer, the soft rays about equal eye, the last ray is joined to the peduncle, in advance of the caudal base. The pectorals are short, about 1.8 in head, and do not reach the anal origin. The pelvics, inserted in advance of the pectorals, are typical, of a small hidden spine and 3 rays, the median longest, the fin webbed for half its length. The caudal is subtruncate and short, 2.2-2.4 in head, and there are 2-3 small procurrent rays above and below. The body, including the belly, is sparsely covered with minute thin cycloid scales, nowhere imbricate or regular. The pectoral base, the nape and head are naked. The lateral line in front runs high along the back and consists of 25-26 double pores, which end above the anal origin. From this point there is a faint indication of rudimentary tubules abruptly down to the mid line of the flank, then about 30-33 along the side to near the caudal base.

In life the body is chiefly red brown, finely speckled with iridescent orange and red, with sharply contrasted pure white areas along the back, but the pattern is variable. In most young the head is mainly white, and there is a continuous white area along the dorsal base from mid body to

the caudal base; sometimes this persists to the adult stage, but in many cases the white area breaks up into three or four dorsal blotches, the last on the upper edge of the peduncle, none of these reaching to the ventral profile. Sometimes in the two front white areas there are dusky ringed brown spots (as in the type). There is a pure white area across the shoulder to below the pectoral. The head is variegated, but mostly white, with pink reflections, the snout and chin are usually brown and the lower part of the head is yellowish green. On the top of the head are two short narrow parallel brown lines between the front nostrils, an eye wide brown area along the interorbital, and a parabola-like line across the occiput diverging forward to and through each eye, sometimes the whole snout is brown. Sometimes there is an eye-wide brown kidney-shaped bar across the nape. The iris is golden brown. The dorsal fin membrane is usually dark olive, the spines brown, but the white areas on the body extend to the apex of the fin in each case. The anal is plain hyaline. The caudal is dark red, with brown speckling on the rays forming vague basal cross bars. The pectoral often has a brown line across the base, and a smaller one below, its proximal half is pure white, distally yellow. The pelvics are yellow. Described from 32 specimens, 12 males, 32-66mm total length, and 20 females, 29-76mm total length, all from intertidal sandy pools at and about Lamberts Bay, Cape, one specimen from Doring Bay; the type, a female, 49mm standard, 54mm total length, from Lamberts Bay.

Genus **Cancelloxus nov.**

Type **Cancelloxus burrelli n.sp.** Elongate Ammodytid-like body and head, sparsely covered with minute scales. Lateral line of single tubules, each on an enlarged scale, runs down from shoulder and median along side. Lower jaw projects, the chin prominent. A cluster of feeble teeth at each symphysis, none on palate. Gillmembranes united, free from isthmus. Dorsal long, origin behind head, the spines feeble, articulated rays fewer than spines. Anal long, of two spines and many soft rays. Pelvics of a hidden spine and three soft rays, webbed almost to the apex. This curious genus is included in the Xenopoclinidae, though it differs in notable characters from the type genus, but in general structure, e.g. that of the vertebral column, it agrees well with the other members.

**Cancelloxus burrelli n.sp.**

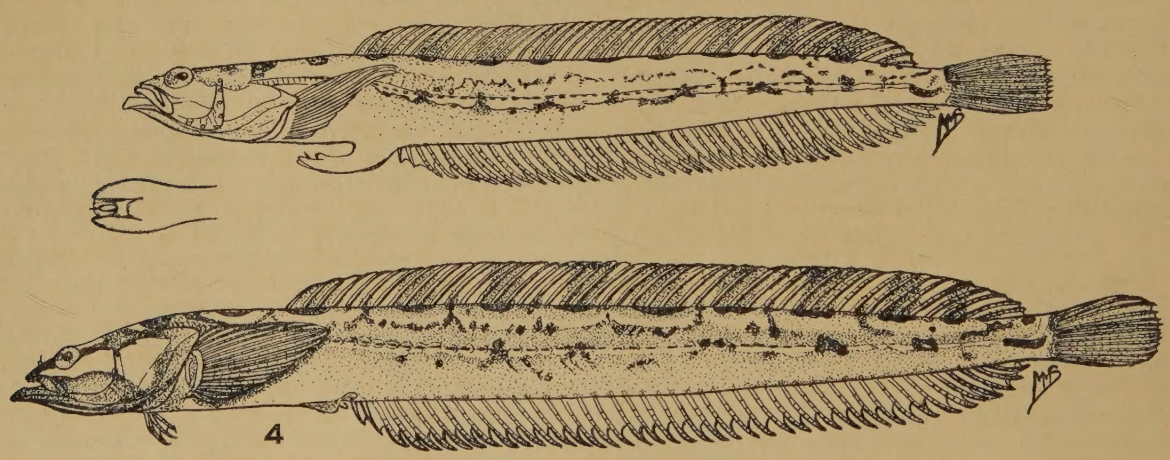


Fig. 4. **Cancelloxus burrelli n.sp.** Type, female, 101mm.
Above, male, 79mm. Inset, apex of genital organ, from above, enlarged.

D XXXIII-XXXV 13 (total 46-48). A II 41-43. P 14-15. V I 3. Cd 1+12+1. L.l. 69-71. 1+1+9 gillrakers. Depth 9-10, head 5-5.3 in body. Eye 5.5-6.5 in head, 3 times interorbital, about equals snout, about 4 in postorbital part of head. The head and body are subcylindrical, the eyes subdorsal. The hind nostril is a small pore above the front of the eye. The hinder is a tube with a simple cilia behind, situated about midway between front of eye and snout tip. The four nostrils form almost a square on the top of the snout. Only the lower preopercle margin is free. The gillmembranes are united, free from the isthmus, and form a fold across the throat. The opercular membrane is continued above the pectoral axil, where it forms a fold. The gillrakers are slender and short. There are only rudimentary pseudobranchiae, being reduced to mere knob-like processes. In the female type there is a prominent double fleshy lobe pointing backwards each side of the urogenital papilla. The males have an unusually large antrorse intromittent organ, 1.5 in head, of

unusual structure. The apex is dilated, and on each side is a pointed lobe. Within these is a finger-shaped organ with apical cirrus, within a skinny sheath, resembling a glans penis. At the base of this, on the upper side, is a knob-like process (see Fig. 4). The mouth is large, horizontal, the lower jaw projects, the chin is prominent, with fleshy lobe, the maxilla reaches to below the middle or front part of the eye, its hind part is not covered by the preorbital, which is narrow, less than the eye. The lips are thick, the lower has a deep cleft at the symphysis. In the upper jaw there is a cluster of fine flexible recurved sharp teeth at the symphysis, and a single series of small recurved teeth along the side of the jaw. In the lower jaw there is a cluster of 3-4 small conical teeth each side of the symphysis, and a single series of recurved teeth along the side of the jaw. The palate is edentate. The tongue is large, free and pointed.

The dorsal origin is two-fifths of a head length behind the head, the spines are flexible, and the front 4-5 do not stain with alizarin, indicating feeble ossification. There is no sharp transition to the soft rays, which are increasingly articulated posteriorly. The first spine is shortest, about 1.5 times eye, the rest increase posteriorly, the last spine is about twice eye, the front soft rays are little longer, then shorten rearwards, the last, shortest, is joined to the peduncle before the caudal base. The dorsal base is 1.5 in body length. The anal is inserted below about the 5-6th dorsal spines, the anal spines feeble, shorter than the rays, the first soft ray is twice the eye, the rays remain subequal for most of the fin, the hindmost few are graduated shorter, the last is joined to the peduncle before the caudal base. The pectorals are pointed, 1.3 in head, and reach above the anal origin. The pelvics are inserted well before the pectorals, the mid ray longest, only the apices of the rays are free from membrane. The caudal is feebly rounded, about 1.5 in head, it has above six and below four fine procurrent rays, all within a small vertical keel of skin. From the dorsal origin backwards the body bears minute, rudimentary, thin, non-imbricating cycloid scales. These run in V-shaped rows, apex backwards, along the outlines of the myomeres on the body, but are nowhere overlapping. There are about 16 scales from the mid dorsal to the lateral line, while the rows are about four scale diameters apart. There are scattered scales below the lateral line, but both sets become feebler and more dispersed rearwards, there are none near the caudal base. The shoulder and head are quite naked. The lateral line is not elevated, it runs obliquely down from the shoulder to the mid side over the end of the pectoral, then straightens and runs along the side to the caudal base. It consists of single tubules each on an enlarged thin scale, those in front adjacent, but from about the twelfth they become separated and run to near the caudal base. These enlarged lateral line scales are at least four times the diameter of the body scales. Colour in life semitranslucent silvery. Along the back is a pattern in light brown, of twelve saddles, each within a vaguely demarcated rectangular area as shown in the figure. The course of the lateral line is marked as a pure white stripe with odd brown areas along its course. Before the eye is a brown line, and there are two behind, the lower runs to the upper margin of the opercle. The head is pinkish, the iris golden with a dark blotch in front. The fins are transparent hyaline, there are two pure white bars across the pectoral base.

Described from three specimens, the type, female, 89mm standard, 101mm total length, and two males, 62 and 79mm length respectively, all taken in a sandy pool at Lamberts Bay, Cape. Named in honour of Cyril J. Burrell, Esq., who has constantly provided valuable aid in my researches. The 79mm male specimen, cleared and stained, shows 16+49 vertebrae.

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